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Abstract

Objectives

To establish empirical evidence for the validity of the following disability categories derived from Health Utilities Index Mark III (HUI3) global utility scores: *none* (1.00), *mild* (0.89 to 0.99), *moderate* (0.70 to 0.88), and *severe* (less than 0.70).

Data and methods

Data from the 2005 Canadian Community Health Survey (cycle 3.1) were analyzed. Frequency distributions, stratum-specific likelihood ratios, and multinomial regression were used to examine the relationship between health indicators and the HUI3 disability categories.

Results

People reporting chronic conditions, activity restrictions, and fair/poor self-rated health (general and mental) were more likely to be in the moderate and severe disability categories. Those having more positive outcomes on the health indicators tended to fall into the mild and no disability groups. The stratum-specific likelihood ratios increased monotonically with the severity of disability level. Compared to those with positive health status characteristics, those with negative health status characteristics had the highest odds of falling in the severe rather than the non-disabled category.

Interpretation

This study makes an initial contribution to the evidence base for the validity of the proposed HUI3 disability categories. The categories were well-supported empirically and are likely to be useful for assessing disability levels.

Keywords

activities of daily living, chronic disease, health status indicators, health surveys

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Functional health status and health-related quality of life are important outcomes in a variety of research contexts, such as population studies,[1] clinical trials,[2] and the evaluation of health care programs.[3] One of the leading instruments for measuring functional health status and health-related quality of life is the Health Utilities Index Mark III (HUI3).[4,5]

The HUI3 describes an individual's functional health status using eight basic attributes: vision, hearing, speech, ambulation, dexterity, emotion, cognition, and pain. Each attribute has five or six levels, ranging from normal to severely limited (or the complete absence of) functioning. For example, levels on the ambulation attribute range from 1 ("able to get around the neighbourhood without difficulty, and without walking equipment) to 6 ("cannot walk at all"). A multi-attribute scoring algorithm synthesizes the descriptive information into a single global utility score, which ranges from -0.36 (worst health state) through 0.00 (dead) to 1.00 (full health).[6] A large body of empirical evidence supports the HUI3 system as having strong reliability and validity[5,7] and demonstrates that it performs particularly well in capturing the health-related quality of life impact of disease in population surveys.[8-13]

An alternative to using HUI3 global utility scores as continuous indices is to group them into *disability categories* based on a previously established system for classifying disability according to the functional levels within each attribute[14,15] (Table 1). This approach has been used in a number of recent studies[16-18] and has several practical advantages over continuous utility scores. First, describing health in a limited number of categories may be more understandable than values ranging from -0.36 to 1.00. A limited number of categories facilitates measuring, monitoring and comparing the health of different clinical and population subgroups by making it possible to examine differences and temporal shifts in the proportions of individuals in each category.

Second, the categories could be helpful in building statistical models of the determinants of disability.

Table 1
Definitions of HUI3 disability categories based on global utility scores

Category	Score range	Description
Category 1: No disability	1.00	No disability or perfect health in which all attributes (dimensions or domains) of health status are at their highest functional level.
Category 2: Mild disability	0.89 to 0.99	Mild disability in which at least one attribute is at a reduced level of function that can be readily corrected and/or does not prevent any activities.
Category 3: Moderate disability	0.70 to 0.88	Moderate disability in which at least one attribute is at a reduced level of function that cannot be corrected and/or prevents some activities.
Category 4: Severe disability	Less than 0.70	Severe disability in which at least one attribute is at a reduced level of function that cannot be corrected and prevents many activities.

Notes: Moderate disability may also describe states with three attributes at reduced (level 2) function. Severe disability may be represented by states with four attributes at reduced (level 2) function.
Source: Adapted with permission from: Feeny D, Furlong W. Health Utilities Index Mark 2 (HUI2) and Mark 3 (HUI3) disability categories for single and multi-attribute utility scores.[15]

Continuous utility scores generated by the HUI3 are typically highly skewed, particularly in data from general population surveys where a high proportion of people report perfect or near-perfect health, and thereby compromise conventional linear modeling techniques that rest on the assumption of normally distributed error terms (for example, multiple linear regression[19]). By contrast, categorical modeling procedures such as multinomial logistic regression can be applied to the proposed HUI3 disability categories, relaxing many restrictive assumptions and yielding more easily interpretable results in terms of predicted probabilities of group membership and odds ratios.

Despite their intuitive and practical appeal, the HUI3 disability categories have not been formally validated with rigorous statistical methods. Rather, they have been applied under the assumption that they represent theoretically and empirically distinct levels of disability. While the various functional health status profiles underlying each disability category appear to have reasonable face validity,[14] the approach is essentially arbitrary. If the categories are to be applied in clinical and population studies, and possibly inform decisions on the allocation of health resources to treatment and intervention programs, it is important to systematically examine their performance as meaningful representations of distinct disability levels. The purpose of the present study is to establish empirical evidence for the validity of the HUI3 disability categories with data from a nationally representative sample of Canadians.

Methods

Data source

Data were obtained from the 2005 Canadian Community Health Survey (cycle 3.1).[20] Launched in 2000, the Canadian Community Health Survey is an ongoing, cross-sectional survey that collects information on health status, health determinants and health care utilization.[21] It is representative of the Canadian household population aged 12 or older in all provinces and territories. It excludes residents of Indian Reserves, Canadian Forces Bases, and certain remote areas. The overall response rate for cycle 3.1 was 79%. For the current study, subsample 1 was selected, in which the HUI3 questions were administered to all respondents. The analysis was limited to those aged 18 or older (N = 29,108).

Analysis variables

The continuous HUI3 variable was recoded into four categories. *No* disability was ascribed to individuals with a score of 1.00. Scores from 0.89 to 0.99 were considered to indicate *mild* disability; from 0.70 to less than 0.88, *moderate* disability; and below 0.70, *severe* disability.[14]

To demonstrate construct validity, health indicators that should be systematically associated with the HUI3 disability categories were selected. These included two broad measures of health: *self-rated general* and *self-rated mental health*, each of which uses a five-point scale ranging from 1 ("excellent") to 5 ("poor").

As well, three variables representing the degree of activity restriction caused by a long-term physical or mental condition or health problem were examined. The *impact of health problems* reflects the frequency of activity limitation ("sometimes," "often," or "never") at home, work or school, and in other activities such as transportation and leisure. *Participation and activity limitation* incorporates the frequency of activity limitation with reported difficulties in hearing, seeing, communicating, walking, climbing stairs, bending, learning or doing similar activities ("sometimes", "often", or "never"). *Help needed for tasks* classifies respondents according to their need for assistance in the following instrumental activities of daily living: preparing meals, shopping for groceries or other necessities, doing everyday housework, doing heavy household chores (washing walls, yard work), personal care (washing, dressing or eating), and moving about inside the house or paying bills. Any positive

response places the respondent in the category "needs help with at least one task."

Because population studies have shown the continuously scaled version of HUI3 to be highly responsive to the health-related quality of life effects of disease,[8-13] associations between the proposed disability categories and the following *chronic conditions* were examined: arthritis or rheumatism, diabetes, heart disease, cancer, stroke, urinary incontinence, chronic bronchitis, and depression or anxiety disorder. These are self-reported on the Canadian Community Health Survey and are defined as professionally diagnosed conditions that have lasted (or are expected to last) six months or more. A dummy variable indicating whether the respondent reported any of the selected chronic conditions was created, as well as a count of the number of conditions reported by each respondent (none, one, and two or more).

Analytical techniques

Empirical validation of the HUI3 disability categories began with cross-tabulations to provide a descriptive overview of the associations among the study variables.

Stratum-specific likelihood ratios[22] were calculated to evaluate the accuracy of the HUI3 disability categories in classifying respondents on the other health indicators. A stratum-specific likelihood ratio is the proportion of cases experiencing an outcome to the proportion of cases not experiencing that outcome within a given range of scores on a test or measuring instrument. Stratum-specific likelihood ratios offer powerful evidence of the accuracy of a measure and are highly generalizable because they do not depend on the prevalence of a given outcome in the study population.[22] Within each HUI3 disability category (stratum), the likelihood of experiencing a negative health outcome (for example, fair/poor self-rated health, presence of a given chronic condition) was computed relative to a positive health outcome (for example, excellent/very good/good self-rated health, absence of a given chronic condition), as well as 95% confidence intervals for the stratum-specific likelihood ratios.[23] It was expected that the ratios would increase monotonically from no disability through severe disability.

To examine whether there was homogeneity of the proportions within the four HUI3 categories across the levels of the other variables, a Pearson χ^2 test of the independence between the categorical version of HUI3 and the other health indicators was conducted. A significant χ^2 test would indicate non-independence of the HUI3 categories and other health variables, supporting the decision to examine specific relationships with a multinomial logit model.

Finally, the salient health variables were used as predictors of the categorical version of HUI3 (no, mild, moderate, and severe disability) in a series of multinomial logit models.[24] (Although an ordinal logistic model would be appropriate to examine the relationship between predictors and the ordered disability categories, preliminary analyses revealed violation of the assumption of equivalence of slopes.) The expectation was that for those reporting a health problem on a given predictor (for example, fair/poor self-rated health, presence of a chronic condition), the odds of falling into a disabled versus the non-disabled reference category should increase monotonically.

All analyses were performed with SAS 9.1 and SAS-callable SUDAAN.[25] To account for the stratified, multistage clustered probability design of the Canadian Community Health Survey, the survey sampling weights were used to produce unbiased point estimates of parameters, and standard errors and 95% confidence intervals were computed using the Rao-Wu bootstrap technique.[26]

Results

Descriptive statistics

The cross-tabulation of sample demographics and selected health measures with the HUI3 disability categories revealed that for both sexes, mild disability was the most common category, followed by no disability, and then, severe disability (Table 2). Moderate disability was the least prevalent category. Men were more likely than women to be in the no disability group (25.5% versus 21.3%), while women were more likely than men to be in the severe disability group (17.2% versus 15.5%). The percentage of people falling into progressively more serious disability groups rose with age. For example, only 11.4% of 18- to 39-years-old were in the severe disability group, compared with 47.5% of people aged 80 or older.

More than four out of five (85.4%) people who reported excellent self-rated general health were in the no and mild disability categories. Conversely, 85.8% of those who reported poor self-rated general health were classified as having moderate or severe disability. Patterns were similar for self-rated mental health. The majority who reported any of the three types of activity restriction (impact of health problems, participation and activity limitation, or help needed for tasks) fell into either the moderate or severe disability groups. The percentage in the severe disability group was highest (54.8%) among those who reported needing help to perform one or more instrumental activities of daily living.

The percentage of the sample in each disability group varied for different chronic conditions. For instance, the most prevalent category among those reporting arthritis/rheumatism, diabetes, heart disease or cancer was mild disability. However, about a third of respondents with these conditions were in the severe category, reflecting the wide range of functional states for these diseases. For those reporting stroke, urinary incontinence, chronic

Table 2
Percentage of sample in each Health Utilities Index Mark III (HUI3) category, by selected characteristics, household population aged 18 or older, Canada, 2005

		HUI3 category			
	Sample size	No disability	Mild disability	Moderate disability	Severe disability
		%	%	%	%
Sex					
Men	13,195	25.5	45.3	13.7	15.5
Women	15,913	21.3	46.3	15.2	17.2
Age group					
18 to 39	10,521	35.8	39.3	13.6	11.4
40 to 59	10,052	20.2	50.1	14.2	15.5
60 to 79	6,869	8.1	53.4	16.0	22.5
80 or older	1,666	4.8	28.5	19.3	47.5
Self-rated general health					
Excellent	5,621	35.9	49.5	8.3	6.2
Very good	10,698	26.2	51.5	13.2	9.1
Good	8,623	17.7	44.2	19.2	19.0
Fair	3,076	6.2	28.4	20.3	45.1
Poor	1,047	1.9	12.3	12.5	73.3
Self-rated mental health					
Excellent	10,131	32.4	48.9	9.0	9.8
Very good	10,536	22.7	50.6	15.0	11.7
Good	6,367	14.1	40.9	21.4	23.6
Fair	1,292	4.7	22.0	25.6	47.7
Poor	284	2.1	6.2	13.6	78.1
Restriction of activities					
Impact of health problems					
Yes	7,591	7.5	26.1	23.4	43.0
No	21,448	28.1	51.7	11.8	8.4
Participation and activity limitation					
Yes	9,917	8.6	31.3	22.6	37.5
No	19,104	29.7	52.0	11.0	7.3
Help needed for activities of daily living					
Yes	4,930	4.7	19.2	21.4	54.8
No	24,122	26.4	50.1	13.4	10.1
Chronic conditions					
Arthritis or rheumatism					
Yes	6,508	7.9	38.5	18.9	34.7
No	22,559	26.9	47.5	13.5	12.2
Diabetes					
Yes	1,888	10.5	41.9	16.7	30.9
No	27,196	24.1	46.0	14.4	15.5
Heart disease					
Yes	1,940	5.8	39.3	19.2	35.7
No	27,123	24.3	46.1	14.2	15.3
Cancer					
Yes	504	8.2	37.2	20.4	34.2
No	28,586	23.6	45.9	14.4	16.1
Stroke					
Yes	477	5.0	22.7	18.5	53.7
No	28,611	23.6	46.1	14.4	15.9
Urinary incontinence					
Yes	1,200	4.1	30.2	17.9	47.9
No	27,879	24.1	46.3	14.4	15.3
Chronic bronchitis					
Yes	920	11.2	34.9	17.6	36.4
No	28,160	23.7	46.1	14.4	15.8
Depression or anxiety disorder					
Yes	2,633	7.5	29.0	22.8	40.8
No	26,436	24.9	47.4	13.7	14.1
Any chronic condition					
Yes	10,833	9.4	40.3	19.0	31.3
No	18,203	30.0	48.4	12.3	9.2
Number of chronic conditions					
0	18,271	30.0	48.3	12.3	9.4
1	7,145	11.5	45.4	18.4	24.7
2 or more	3,688	4.6	29.1	20.4	46.0

Source: 2005 Canadian Community Health Survey.

bronchitis or depression/anxiety disorder, the most prevalent category was severe disability. Relatively few respondents with these conditions were in the no disability group. This may reflect the more debilitating nature of these conditions, as well as the higher percentage of older adults who report them.

Stratum-specific likelihood ratios

Overall, the stratum-specific likelihood ratios supported the HUI3 categorization (Table 3). All ratios for the no and mild disability categories were less than 1.00, indicating that individuals in these categories were unlikely to have any of the selected health conditions.

Stratum-specific likelihood ratios in the moderate disability category ranged from 1.16 to 2.06, indicating that this category does not discriminate well between cases and non-cases of the health conditions. Because the HUI3 disability categories are based on a range of functional attributes, it is to be expected that any single health condition would not be predicted particularly well.

For the severe disability category, stratum-specific likelihood ratios were generally high, occasionally exceeding 5.00, which indicates that individuals in the severe category were more likely than not to have the selected conditions. The exceptions were chronic bronchitis and diabetes, each with a ratio less than 2.00, which suggests that the proposed HUI3 disability categories are not good at discriminating between individuals with and without these conditions. The highest ratios, indicating the best discriminatory power, were for the activity limitation variables. This is consistent with the HUI3 being based on levels of functioning across a range of domains.

Multinomial logistic regression

As a precursor to the multinomial logistic regression, a Pearson χ^2 test formally evaluated the homogeneity of the proportions within the four disability categories across the levels of the other variables. The null hypothesis of independence was rejected in all cases (data not shown), demonstrating significant heterogeneity in the proportions among the mild, moderate and severe disability categories within the levels of the other indicators.

The odds of falling in a more severe disability category given a negative health experience for each predictor were modeled, setting "no disability" as the reference category (Table 4). The odds ratios were highest for the most severe disability category. For instance, the odds that people who rated their general health as fair/poor would be in the severe rather than the no disability group were 23 times the odds for people who rated their general health excellent, very good, or good. The odds ratios for specific conditions were generally lower than those for the more global health measures. For example, individuals with arthritis/rheumatism had almost ten times the odds of being in the severe rather than the no disability category, compared with those who did not report arthritis/rheumatism. As expected, the lowest odd ratios were for mild versus no disability, ranging from 1.6 for chronic bronchitis to 3.9

Table 3
Stratum-specific likelihood ratios for selected health status characteristics, by Health Utilities Index Mark III (HUI3) category, household population aged 18 or older, Canada, 2005

	HUI3 category											
	No disability			Mild disability			Moderate disability			Severe disability		
Health status characteristics	Stratum-specific likelihood ratio	95% confidence interval		Spectrum specific likelihood ratio	95% confidence interval		Spectrum specific likelihood ratio	95% confidence interval		Spectrum specific likelihood ratio	95% confidence interval	
		from	to		from	to		from	to		from	to
Self-rated general health	0.20	0.17	0.23	0.50	0.47	0.53	1.31	1.21	1.42	4.49	4.28	4.70
Self-rated mental health	0.17	0.13	0.22	0.40	0.36	0.44	1.67	1.52	1.84	3.94	3.73	4.17
Impact of health problems	0.27	0.25	0.29	0.51	0.48	0.53	1.98	1.87	2.09	5.12	4.86	5.39
Participation and activity limitation	0.29	0.27	0.31	0.60	0.58	0.62	2.06	1.95	2.18	5.14	4.86	5.43
Help needed for activities of daily living	0.18	0.15	0.20	0.38	0.36	0.41	1.60	1.49	1.71	5.41	5.16	5.66
Arthritis or rheumatism	0.29	0.27	0.32	0.81	0.78	0.84	1.41	1.32	1.50	2.84	2.70	2.98
Diabetes	0.44	0.38	0.51	0.91	0.86	0.97	1.16	1.03	1.30	1.99	1.84	2.15
Heart disease	0.24	0.19	0.29	0.85	0.80	0.91	1.35	1.21	1.51	2.33	2.16	2.51
Cancer	0.35	0.25	0.48	0.81	0.72	0.92	1.42	1.17	1.72	2.12	1.85	2.43
Stroke	0.21	0.14	0.33	0.49	0.41	0.60	1.29	1.04	1.60	3.38	3.06	3.73
Urinary incontinence	0.17	0.12	0.23	0.65	0.59	0.72	1.24	1.08	1.43	3.14	2.93	3.38
Depression or anxiety disorder	0.30	0.26	0.35	0.61	0.57	0.65	1.66	1.54	1.80	2.90	2.74	3.07
Chronic bronchitis	0.58	0.48	0.71	0.93	0.85	1.02	1.50	1.29	1.75	1.37	1.18	1.59

Source: 2005 Canadian Community Health Survey

Table 4
Odds ratios relating selected health status characteristics to Health Utilities Index Mark III (HUI3) categories, reference set to "no disability," household population aged 18 or older, Canada, 2005

	HUI3 category								
	Severe disability versus no disability			Moderate disability versus no disability			Mild disability versus no disability		
		95% confidence interval			95% confidence interval			95% confidence interval	
Health status characteristics	Odds ratio	from	to	Odds ratio	from	to	Odds ratio	from	to
Self-rated general health									
Fair/Poor	22.78	17.91	28.99	6.65	5.17	8.57	2.54	1.98	3.26
Excellent/Very good/Good[†]	1.00	..	..	1.00	..	..	1.00	..	..
Self-rated mental health									
Fair/Poor	23.22	15.78	34.15	9.86	6.55	14.84	2.36	1.54	3.60
Excellent/Very good/Good[†]	1.00	..	..	1.00	..	..	1.00	..	..
Restriction of activities									
Impact of health problems[‡]									
Yes	19.14	16.38	22.37	7.39	6.26	8.71	1.89	1.63	2.19
Participation and activity limitation[‡]									
Yes	17.75	15.16	20.79	7.12	6.10	8.32	2.08	1.81	2.39
Help needed for activities of daily living[‡]									
Yes	30.61	24.67	37.98	9.04	7.17	11.40	2.17	1.73	2.71
Chronic conditions									
Arthritis or rheumatism[‡]									
Yes	9.70	8.18	11.51	4.18	4.04	5.73	2.77	2.36	3.27
Diabetes[‡]									
Yes	4.56	3.57	5.83	2.66	2.00	3.54	2.09	1.63	2.68
Heart disease[‡]									
Yes	9.78	6.90	13.88	5.68	3.94	8.21	3.58	2.51	5.10
Cancer[‡]									
Yes	6.10	3.72	10.00	4.08	2.42	6.88	2.33	1.42	3.83
Stroke[‡]									
Yes	15.87	9.19	27.40	6.03	3.15	11.55	2.31	1.26	4.23
Urinary incontinence[‡]									
Yes	18.62	12.08	28.70	7.37	4.63	11.74	3.86	2.46	6.04
Depression or anxiety disorder[‡]									
Yes	9.66	7.60	12.28	5.55	4.33	7.11	2.04	1.59	2.60
Chronic bronchitis[‡]									
Yes	4.87	3.60	6.60	2.58	1.81	3.68	1.60	1.16	2.21
Any chronic condition[‡]									
Yes	10.87	9.50	12.45	4.95	4.30	5.70	2.67	2.37	3.01
Number of chronic conditions[‡]									
1	4.99	4.28	5.82	2.97	2.51	3.51	1.69	1.48	1.93
2+	18.02	13.74	23.63	6.66	4.97	8.93	2.08	1.58	2.74

† reference category
‡ reference category is absence of restriction or condition
.. not applicable
Source: 2005 Canadian Community Health Survey.

for urinary incontinence. When the analyses were repeated controlling for age and sex, the odds ratios were slightly attenuated, but the pattern of results did not change (data not shown).

Limitations

Although the findings of this analysis are encouraging from both a theoretical and practical perspective, some limitations of the methodology should be acknowledged.

The questions in the Canadian Community Health Survey may be subject to self-report bias. For example, the prevalence of chronic conditions tends to be under-reported in population surveys.[27,28] Further work using clinical

administrative databases linked to population survey data might help rectify this problem.[29]

The Canadian Community Health Survey is a household survey and excludes residents of health institutions. Thus, the most disabled segment of the population was not considered in the analyses. It would be useful to repeat the current study with an institutional sample.

The proposed HUI3 disability categories are intended to provide a universal standard, a single "ruler," that facilitates comparisons of disability levels across different subpopulations, health conditions, and over time.[14] However, the proposed cut-points delimiting the categories will probably not be optimal for any given general or clinical population.[30] For example, to classify subjects with multiple sclerosis into mild, moderate or severe disability levels, the proposed cut-points might not be the best choice. To compare levels of disability associated with specific diseases, it would be useful to examine the prevalence of no, mild, moderate or severe disability defined by cut-points for each of the different conditions.

Because membership in the no disability category requires a perfect HUI3 global score (1.00), application of the categories is likely to yield high estimates of the prevalence of disability, except among the youngest age groups. The disability cut-points in the present study resulted in approximately 75% of men and almost 80% of women aged 18 or older being labelled as at least mildly disabled. These high percentages reflect the fact that the HUI3 assesses functional health status in terms of intrinsic capacity (what individuals are capable of doing) rather than performance (what they actually do in their physical and social milieux).[1,5] Therefore, common, easily correctable limitations such as near- and farsightedness figure heavily in a disability count. Those who apply the categories should recognize that high percentages for disability, particularly the mild category, do not necessarily represent an unusually large societal burden in terms of functional limitations. The moderate and severe categories are probably more policy-relevant indicators of the prevalence of disability.

One option for reducing potential over-reporting of trivial disability is to collapse no and mild disability into a single category.[9] Alternatively, an "attribute-deleted" approach to computing HUI3 global scores[31] can be used before dividing the study sample into disability categories. This involves creating hypothetical scenarios by resetting certain attribute levels to 1 (normal function). In this way, the specific types of disability included in the count can be controlled at the outset, and the focus can be on those deemed most relevant for the study. For instance, levels 2 and 3 on the Vision attribute represent common problems corrected by glasses or contact lenses, to which most people have access. Thus, fixing Vision at level 1 for such respondents appears to be a reasonable strategy to minimize the estimated prevalence of minor limitations. The same approach could be applied to the Pain attribute, especially for people rating themselves at level 2 ("mild pain that prevents no activities"), which refers to problems easily controlled by over-the-counter medications.

Conclusions

This study is the first published attempt to empirically validate a proposed set of disability categories based on HUI3 global utility scores, using data from a nationally representative household survey. A range of descriptive and modeling procedures demonstrated that the disability categories were systematically associated with a variety of other health indicators. People reporting fair/poor self-rated general and mental health, activity restrictions, or chronic conditions tended to fall into categories indicating greater levels of disability. The stratum-specific likelihood ratios showed that the likelihood of reporting a negative health experience (fair/poor self-rated general and mental health, activity restriction, presence of a chronic condition) given membership in a particular disability category, increased monotonically with the severity of disability level. A multinomial regression showed that reporting fair/ poor general or mental health, functional limitations or a chronic condition increased the odds of being in a more severe disability category rather than the no disability category. In sum, these results provide empirical support for using the proposed HUI3 disability categories for health research.

Both the stratum-specific and multinomial regression analyses indicated stronger relationships between the HUI3 categories and self-rated general and mental health and functional limitations, than between the categories and specific conditions. As well, the relationship between the HUI3 categories and specific health conditions varied. Conditions that tend to affect a range of domains, such as stroke and depression/anxiety, were more strongly related to the categories than were conditions with more focused symptoms, or that generally have fewer symptoms, such as heart disease and diabetes. This supports the construct validity of the HUI3 disability categories as meaningful global indicators.

Despite some limitations, the present study makes a first and substantial contribution to the evidence base for the HUI3 disability categories proposed by Feeny et al.[14,15] This categorization system would seem to have considerable potential for facilitating the assessment of disability in a broad variety of research contexts.

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